

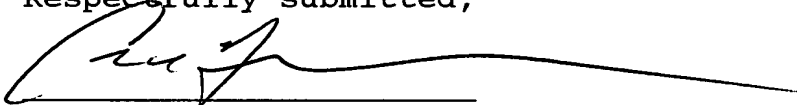
as shown in the marked-up copy and includes no new matter.  
Therefore, entry of the Substitute Specification is respectfully requested.

The claims have also been amended to more clearly describe the features of the present invention.

Entry of the preliminary amendments and examination of the application is respectfully requested.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (503.35636X00) and please credit any excess fees to such deposit account.

Respectfully submitted,



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## TITLE OF THE INVENTION

INFORMATION DISPLAY SYSTEM FOR DISPLAYING SPECIFIED  
LOCATION WITH MAP THEREAROUND ON DISPLAY EQUIPMENT

## 5 BACKGROUND OF THE INVENTION

The present invention relates to an information display system, <sup>and more particularly</sup> [especially relates] to a navigation system providing [a] <sup>for</sup> course guidance <sup>for a car</sup> to a predetermined place, by calculating [a] <sup>the</sup> car's position and displaying <sup>calculated</sup> the [car's] position [with] <sup>on</sup> a map <sup>produced</sup> [therearound] <sup>also</sup> on a display, <sup>other</sup> (said) <sup>of interest</sup> <sup>that</sup> navigation system providing information for a user [intelligibly] by obtaining [said] information from a network, like the internet, from which various kinds of data are provided.

15 A navigation system typically <sup>on a display,</sup> [Navigation] system shows a car's calculated position, based on various sensor information <sup>The</sup> [on a] display, <sup>shows</sup> with a map, <sup>at the center</sup> [surrounding] the car's position, <sup>based on</sup> [by taking out] map data stored in a CD-ROM, and by setting a <sup>target</sup> [goal] position, [and] a course guidance to the <sup>target</sup> [goal] position is shown on the display.

20 In the CD-ROM, various information, <sup>of interest to those</sup> [necessary for a] driving <sup>in a</sup> car, such as information about sightseeing, <sup>areas</sup> [spot] or information <sup>as to the location</sup> of gas service <sup>stations, is</sup> [station] are inputted and indicated on the display <sup>in response</sup> [according] to a request <sup>by</sup> [of] the user.

25 In this case, necessary information should be stored beforehand in the CD-ROM. <sup>However, since</sup> [As] the CD-ROM is used only to [be] read out, <sup>data</sup> it is not suitable for use as a medium to store

information <sup>which changes</sup> [changing] with time, for example, [a] traffic [jam] information. Even if it is assumed that a rewritable memory <sup>to be</sup> is <sup>for this purpose</sup> used temporarily, it is troublesome for the user to input <sup>such</sup> [the] information.

- 5 In order to solve such <sup>a</sup> problem in the conventional navigation system, as <sup>disclosed in</sup> [shown by] Japanese Patent Laid-open Nos. 7-105492(1995), 7-261661(1995), 8-139193(1996), <sup>[any]</sup> communication equipment is provided in the <sup>part of the</sup> car as <sup>[a]</sup> navigation equipment, and receives <sup>to receive</sup> any facility data, so as
- 10 to provide [the] information which is not provided by CD-ROM. <sup>however,</sup> <sup>effecting</sup> In order to communicate with a car, <sup>a</sup> means of mobile communication, like a cellular telephone system, needs to be used. However, <sup>the</sup> data transmission speed of [the] <sup>a</sup> cellular telephone system is slow, and further, when it is used by a
- 15 <sup>moving</sup> [running] car, <sup>it is easy for the car to move out of the range of</sup> the channel of the cellular telephone system <sup>such a system</sup> is easy to run out, and [it] is not suitable for sending a large quantity of data. Furthermore, when <sup>the</sup> [a] driver of the car wants to <sup>view</sup> [see the] information during driving, the driver's <sup>attention</sup> is averted from his <sup>or her</sup> driving depending on the information
- 20 display method, <sup>creating a</sup> (and it is) <sup>situation</sup> dangerous for the driver. The information sent by a communication <sup>system</sup> [means] should be capable <sup>of being</sup> [to be] <sup>conveniently by</sup> accessed [for convenience of] the user, and <sup>so</sup> a good <sup>method</sup> acquisition [method] of <sup>such</sup> [the] information is needed. <sup>in a display system for an automobile</sup>

## 25 SUMMARY OF THE INVENTION

Referring to the above stated <sup>problems</sup> [problem], an object of the present invention is to provide a navigation system [ ] by

which <sup>a large amount of</sup> ~~(much)~~ information <sup>may</sup> ~~(is capable to)~~ be accessed so as to suitably control the amount of ~~(the)~~ information to be communicated, <sup>wherein</sup> and the received information is capable <sup>of being</sup> ~~(to be)~~ displayed intelligibly.

5        <sup>For this purpose, a</sup> ~~(An)~~ navigation system is constituted with ~~(an)~~ information display equipment <sup>for displaying</sup> ~~(indicating)~~ information received through a mobile communication system, information offering equipment which obtains the information by connecting to a network and transmits the obtained  
10 information to the information display equipment, and ~~(a)~~ communication equipment <sup>for effecting the transmission of the information</sup>.

The information offering equipment <sup>is</sup> ~~(comprises a)~~ <sup>includes</sup> ~~(connecting means to be)~~ connected to the network and a memory <sup>in which</sup> ~~(means)~~ to store the information <sup>to be</sup> sent to the  
15 information display equipment, ~~(and obtains)~~ the <sup>very obtained</sup> information from information offering servers connected to ~~(a)~~ network <sup>the</sup> ~~(and stores it in the memory means).~~

<sup>also</sup> The information offering equipment ~~(comprises a)~~ retrieval means to retrieve ~~(the)~~ information to be provided  
20 to the user from the memory ~~(means furthermore)~~, and a communication means to transmit and receive data <sup>to and from</sup> ~~(with)~~ the information display equipment, <sup>whereby</sup> ~~(thereby)~~ a <sup>particular</sup> kind of information <sup>requested</sup> ~~(demanded)~~ by the user <sup>via</sup> ~~(from)~~ the information display equipment is ~~(received and the information)~~ retrieved  
25 from the memory <sup>and</sup> ~~(means)~~ is transmitted to the information display equipment. In order to suitably control the amount of ~~(the)~~ data to be transmitted <sup>using</sup> ~~(with)~~ the communication

equipment, a data selection means and a data processing means <sup>may be provided</sup> [are prepared at need].

The information display equipment comprises an input means to input [a kind of the] information that the user <sup>requests</sup> [needs], and a communications means to transmit a retrieval key word [input] to the information offering equipment, or to receive [the] information provided from the information offering equipment. The information display equipment further comprises a map memory [means] to store map data, a map display <sup>unit</sup> [means] to retrieve [the] map data from the map memory [means] and to display [the] map on the display, and an icon display <sup>unit</sup> [means] to display an icon [to] <sup>at</sup> a position <sup>on the map</sup> where [the] information provided from the information offering equipment is [stored, on the map] <sup>to be</sup> displayed by the map display means. The information display equipment further comprises an icon select means by which a user selects [the] <sup>an</sup> icon displayed <sup>by</sup> [on] the display equipment, a retrieval means to retrieve [the] information <sup>indicated by</sup> [about] the selected icon <sup>either</sup> from the information stored in a detailed information store [means storing the information] or [the] <sup>from</sup> detailed information sent from the information offering equipment, and a detailed information display means to display the information retrieved [to with] <sup>on</sup> the map on which <sup>the</sup> [an] icon is displayed.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1, <sup>schematic diagram</sup> [shows a constructive view] of [the] navigation

system in accordance with

1 [equipment to realize] the present invention.

Figure 2 <sup>is a block diagram</sup> [shows a constructive view] of the information display equipment <sup>in the system of</sup> [to realize] the present invention.

Figure 3 <sup>is a block diagram</sup> [shows a constructive view] of the information <sup>offering</sup> [display] equipment <sup>in the system of</sup> [to realize] the present invention.

Figure 4 <sup>is a block diagram</sup> [shows a view of hardware construction] of the arithmetic processing <sup>unit of</sup> [department to realize] the information display equipment.

Figure 5 <sup>is a block diagram</sup> [shows] a functional <sup>unit of</sup> [construction figure] of the arithmetic processing <sup>unit of</sup> [department to realize] the information display equipment.

Figure 6 <sup>is a more detailed functional block diagram</sup> [shows a function construction figure] of the arithmetic processing <sup>unit of</sup> [department to realize] the information display equipment.

Figure 7 <sup>is a functional block diagram of the control unit</sup> [shows a function construction figure] of the [arithmetic processing department to realize the] information offering equipment.

Figure 8 <sup>is a diagram</sup> [shows a view] which shows <sup>a</sup> [the] retrieve screen.

Figure 9 <sup>is a diagram which</sup> [shows a view which retrieves] <sup>retrieval</sup> by using a phone number.

Figure 10 <sup>is a diagram which</sup> [shows a view] <sup>for setting</sup> [which sets] an item retrieved with precedence.

Figure 11 <sup>is a diagram which</sup> [shows a view which displays] <sup>the display of</sup> a retrieval range.

Figure 12 <sup>is a diagram</sup> [shows a view] which shows the range retrieved with an acquisition time.

Figure 13 <sup>is a diagram</sup> [shows a view] which shows a retrieval range

when retrieving along with a path.

Figure 14<sup>is a diagram</sup> [shows a view] which shows an example of a fixed form format.

Figure 15<sup>is a diagram</sup> [shows a view] which shows an example of a free format.

Figure 16<sup>is a diagram</sup> [shows] a view which displays an icon contained by the information.

Figures 17(a) and 17(b) are diagrams showing  
[Figure 17 shows a view which shows] an operation in which icons do not overlap.

Figure 18<sup>is a diagram</sup> [shows a view] which shows<sup>a</sup> location of the information with an icon on the map top.

Figure 19<sup>is a diagram</sup> [shows a view] which shows (the) individual information by changing<sup>a</sup> property of the icon.

Figures 20(a) and 20(b) are diagrams showing  
[Figure 20 shows a view which displays] detailed information of (an) icon [selected].

Figure 21<sup>is a diagram showing</sup> [shows] a view which displays detailed information of an icon selected with the map.

Figures 22(a) and 22(b) are diagrams showing  
[Figure 22 shows a view which shows that] detailed information [are] divided<sup>being so as</sup> to be displayed into several pages.

Figures 23(a), 23(b) and 23(c) are diagrams showing how  
[Figure 23 shows a view] which [shows] to come back to a former screen after offering the information.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The information provided to the user is sent from an information offering server through a network to information offering equipment, and the information that has been sent is stored in [a] memory equipment so<sup>that it may</sup> [as to] be

provided <sup>in response</sup> <sup>a</sup> <sup>by</sup> <sup>according to</sup> to request <sup>of</sup> the user. When the user requests <sup>(to be offered the)</sup> information, the information is retrieved from this memory equipment <sup>according to</sup> <sup>by</sup> a retrieval condition of the user <sup>and</sup> and is transmitted to the  
 5 information display equipment.

In the information offering equipment, data which should be transmitted to the information display equipment <sup>is</sup> <sup>(are)</sup> selected and processed <sup>(furthermore)</sup>. The information requested by the user and transmitted to the information  
 10 display equipment from the information offering equipment is displayed with an icon <sup>at</sup> <sup>(to)</sup> the position on the map <sup>relevant to</sup> <sup>(where)</sup> the information <sup>which</sup> is stored. When one of the <sup>icons</sup> <sup>(icon)</sup> displayed <sup>on the map is selected by</sup> <sup>(by)</sup> operation of the user <sup>(is selected)</sup>, the detailed information which relates to the icon is displayed.

15 Referring to <sup>the drawings</sup> <sup>(in)</sup> following figures, one embodiment of a navigation system having information offering equipment <sup>according to</sup> in this invention will be explained.

A navigation system <sup>according to</sup> <sup>(in)</sup> this embodiment, as shown in Fig. 1, has information offering equipment 2 to obtain  
 20 various information from <sup>(an)</sup> information offering <sup>server</sup> <sup>(server)</sup> 3 connected through a network 4, such as the internet, and to provide <sup>the information</sup> <sup>(it)</sup> to a user, and <sup>The system further includes</sup> <sup>(an)</sup> information display equipment  
 1 to display a car's position, to provide course guidance <sup>the driver of</sup> to the car, and to provide <sup>for</sup> <sup>(a)</sup> presentation <sup>and display</sup> of <sup>(the)</sup>  
 25 information <sup>of interest to the user</sup> from the information offering equipment 2 [etc.] according to <sup>a</sup> <sup>(the)</sup> request of the user.

The information display equipment 1 will be explained



with reference to  
 , [using] Fig. 2. →

The information display equipment 1 <sup>includes</sup> [has] an arithmetic processing <sup>unit</sup> [department] 10, a display unit 11, a map memory 12, an internal information memory 13, a voice input and  
 5 output unit 14, an input unit 15, a wheel speed sensor 16, a magnetic compass 17, a rate gyro 18, a GPS receiver 19, an icon image memory 20 and [a] display side communication equipment 21.

The arithmetic processing <sup>unit</sup> [department] 10 <sup>includes</sup> [has] a means  
 10 to calculate a current position of a moving body, <sup>such as a</sup> [like the] car in which the navigation equipment is installed, by using the information output from the <sup>sensors</sup> [above sensor] 16, 17, 18 and the GPS receiver 19, and a means to select a most suitable road which connects <sup>the</sup> current position <sup>of the car</sup> with a <sup>target</sup> [goal] position  
 15 <sup>indicated</sup> [directed], by the user and to <sup>indicate both the route and current position to the user</sup> [notify them by] using a sound and graphic display [to the user].

The arithmetic processing <sup>unit</sup> [department] 10 sets a display domain according to the calculated current position of the moving body or <sup>according to</sup> scroll operation by the user, reads  
 20 out the map data corresponding to the display domain from the map memory 12, provides graphic information from the map data [which are] <sup>being</sup> read out, and performs a graphical processing so as to display <sup>the data</sup> [it] on the display unit 11. [When]  
 [the current position is displayed, the] <sup>the</sup> current position of  
 25 the moving body is displayed by a mark <sup>along</sup> with [a] graphics information corresponding to the map showing <sup>features in</sup> the neighborhood of the current position.

The display unit 11 <sup>operates</sup> [is a unit] to display [the] graphics information <sup>provided</sup> [formed] by the arithmetic processing <sup>unit</sup> [department] 10, and <sup>includes</sup> [is constructed with] a cathode ray tube or a liquid crystal display. <sup>for this purpose</sup> The arithmetic processing <sup>unit</sup> [department] 10 is connected to the display unit, <sup>by way of</sup> [with] a <sup>signal line</sup> [signaling] S11. <sup>providing</sup> [such] [as] Red, Green, Blue signaling or NTSC signaling. The map memory 12 reads out [ ] <sup>or</sup> writes in <sup>map</sup> [necessary] data from a storage media, such as a CD-ROM or an integrated circuit card, <sup>in response to an</sup> [by receiving] outside indication.

10 The voice input and output unit 14 converts a message to be transmitted to the user [ ] into a voice signal, and recognizes a voice generated by the user so as to transmit it to the arithmetic processing <sup>unit</sup> [department].

The input unit 15 <sup>operates</sup> [is a unit] to accept <sup>commands</sup> [indication] from the user, and it is constructed <sup>by</sup> [with], for example, a joy stick to allow scrolling <sup>of</sup> the map [indicated], an electric switch, such as a <sup>for input of a command</sup> button, a touch panel [put] on the display unit, etc.

20 The wheel speed sensor 16 measures the <sup>through which</sup> [moving] distance [of] the moving body, <sup>travels,</sup> from a product of the circumference of a wheel of the moving body and <sup>the</sup> revolution speed of the wheel, and measures the turning angle of the moving body from <sup>the</sup> difference <sup>between the</sup> [of] revolution speeds <sup>of</sup> [between] a pair of <sup>the</sup> wheels. The magnetic compass 17 detects [a] <sup>the</sup> geomagnetic field [ ] and <sup>indicates the</sup> [measures a] direction <sup>in which</sup> [where] the moving body <sup>is moving</sup> [faces]. The gyro 18 <sup>in the form of</sup> [has] an optical fiber gyro or a vibration gyro, [and] measures the turning angle of the

moving body when the moving body turns.

The GPS receiver 19 receives a <sup>signal</sup> [signaling] from GPS satellites and calculates a current position, a moving angle and a moving direction of the moving body by measuring <sup>the</sup> distance [and] <sup>the</sup> between the moving body and <sup>the</sup> satellite and [a change] <sup>change of</sup> rate of the distance relating to three or more satellites. These sensors and equipment [as] [above] are used in order to detect the current position of <sup>the</sup> moving body by [a] navigation processing.

10 The icon image memory 20 stores images of icons which <sup>are</sup> [is] used when the information <sup>obtained</sup> [got] from the information offering equipment 2 is displayed on the map. <sup>stores</sup> [Said] <sup>the</sup> internal information memory 13 [memorizes] various kinds of information to offer to the user, [and] most of the <sup>is</sup> information [is] static information which <sup>is</sup> [are] updated [with] a low frequency, for example, information [of] a sightseeing <sup>area</sup> [spot], <sup>as to the location</sup> information of a gas station, guide information <sup>concerning</sup> [of] (the) accommodations or a leisure facility, and tariff information [of] a toll road. Here, the navigation system [in] of the present invention has a function to offer <sup>other fundamental</sup> (the) information [depended] on a map [fundamentally] in addition to, above, and there <sup>provided</sup> is [location] on [a] map [equivalent] a lot of <sup>equivalent</sup> [said] information to be offered. In other words, most of <sup>the</sup> [them are] individual information [that have] a location <sup>corresponds</sup> information which respectively [correspond] with [the] locations on the map, and the individual information is offered by <sup>assigning a</sup> [appointing the] location on the map, <sup>thence</sup> and the

the location of selected individual information <sup>is</sup> [are] indicated on the map [top] as explained in the following.

The display side communication <sup>equipment</sup> [device] 21 communicates with the information offering <sup>equipment</sup> [device] 2, and obtains [the] information <sup>therefrom</sup> [from the information offering device 2] which mainly changes with time and <sup>is</sup> [are] updated with a high frequency, for example, traffic [jam] information [of a road], [vacant] <sup>occupancy</sup> information [of] <sup>for</sup> a hotel [and] <sup>or</sup> a parking lot, weather information, and <sup>product</sup> [sale] information [of] <sup>for</sup> a store, <sup>will be</sup> as explained in the following. The information provided in this way from the information offering device 2 <sup>is</sup> [are] individual information [having the] <sup>including</sup> location information respectively corresponding to locations on the map in the same way as the individual information <sup>stored</sup> [memorized] in the internal information memory 13. <sup>P</sup> The communication volume which is most suitable for [the] mobile communication, <sup>which</sup> [that] is one of the most distinctive characteristics of the present invention, is determined by [controlling] not <sup>transmitter</sup> [to send the] information which <sup>can</sup> [are able to] be stored <sup>in</sup> [by] the internal information memory 13 and <sup>which need be</sup> [are] not updated frequently. [As] <sup>since</sup> it is possible to select the individual information which is [related to the individual information] sent by the information offering device 2, according to the location on the map, from the individual information <sup>stored</sup> [memorized] in the internal information memory 13, [the] sufficient information <sup>can be</sup> [is] offered, while <sup>the</sup> communication channel capacity is low, by combining the individual information to be

related according to [the] necessity.

In this embodiment of the present invention, the memory is <sup>divided</sup> [sorted] into <sup>a</sup> [the] map memory, <sup>an</sup> [the] internal information memory[,] and <sup>an</sup> [the] icon image memory according to  
 5 the kind of [the] information to be stored, however, it is possible to store plural kinds of [the] information <sup>using</sup> [with] one memory.

In addition <sup>while</sup> [to above], in this embodiment of the present invention, <sup>a</sup> [the] map memory,  
 10 <sup>an</sup> [the] internal information memory[,] and <sup>an</sup> [the] icon image memory according to a kind of the information to be stored, [however] one of the memories may store several kinds of [the] information.

<sup>as</sup> [For example, as] shown in Figure 4 <sup>unit</sup> [as a hardware]  
 15 [construction], the arithmetic processing <sup>perform</sup> [department] 10 is comprised of a central processing unit 31 to <sup>control the operation of</sup> [control the] calculation and, each device, a random access memory 32 to store [the] map data and calculation data temporarily, a  
 read only memory 33 to store the system program, a DMA <sup>unit</sup> 34  
 20 to execute <sup>direct</sup> [each] data transfer between one memory and <sup>another</sup> [other] memory at high speed and between the memory and each device, a display controller 35 to <sup>generate</sup> [execute and indicate] graphics information (generation) <sup>so</sup> as to develop vector data  
 [in] <sup>for</sup> an image at high speed, a VRAM 36 to <sup>store</sup> [save] graphics image  
 25 data, a color pallet 37 to convert the image data into Red, Green, <sup>and</sup> Blue codes, an analog-to-digital converter 38 to convert an analog signal into a digital signal, a SCI 39

to convert a serial signal into a parallel signal, a programmable input-output chip 40 to synchronize with the parallel signal and [so as] to output <sup>data</sup> on the bus 30, a counter 41 to count <sup>a</sup> pulse signal, and [said] <sup>a</sup> bus 30 to connect <sup>the CPU 31 to all</sup> [between every] devices.

<sup>Details of the construction and operation</sup>  
[Construction] of the arithmetic processing [department] <sup>unit</sup> 10 will be explained using Figure 5 [1] and Figure 6.

As shown in Figure 5, the arithmetic processing <sup>unit</sup> [department] 10 is comprised of a user operation analysis means 50, a path account means 51, a course guidance means 52, a present position arithmetic means 55, a map match processing means 56, and a menu display means 58, [as a] <sup>representing</sup> means [mainly relating] to <sup>effect</sup> [a] navigation processing, such as [car's] position calculation and course guidance <sup>for an automobile</sup>.

The present position arithmetic means 55 respectively integrates distance pulse data measured with the wheel speed sensor 16 and angular acceleration data measured with the gyro 18, and calculates a position  $(X', Y')$  of the moving body <sup>relative to</sup> [moved from] an initial position  $(X, Y)$  by integrating the distance data and the angle data during one fixed cycle time obtained by the above calculation. Furthermore, in order to set an initial value of <sup>the</sup> [advance] <sup>movement of</sup> direction of the moving body, a relationship <sup>between</sup> [of an] angle data provided from the gyro 18 and an absolute direction is set by using the directional data provided from the magnetic compass 17.

Furthermore, the present position arithmetic means 55

outputs current position information after having revised the sensor data with the position data provided from the GPS receiver 19 by a predetermined cycle time, <sup>whereby</sup> ~~thereby~~ a sensor error to be accumulated is canceled by integrating  
 5 the data provided from the sensor as stated ~~the~~ above.

Generally speaking, in the present position information provided in this way, <sup>an</sup> error <sup>in</sup> ~~of~~ the sensor may be still <sup>present</sup> ~~contained~~. On this account, in order to raise <sup>the</sup> position accuracy, <sup>even more</sup> ~~furthermore~~, a next map match <sup>process</sup> ~~attention~~  
 10 is performed by the map match processing means 56.

The map match processing compares ~~a~~ road data contained in the map <sup>surrounding</sup> ~~around~~ the current position read in by a data read-in means 57 with a traveling trace obtained from the current position arithmetic means 55, <sup>whereby</sup> ~~thereby~~ the  
 15 current position is processed to match ~~to~~ the road where the mutual shape relation becomes highest. By applying this map match processing in most <sup>cases</sup> ~~case~~, the current position comes to correspond with the <sup>being traveled</sup> ~~traveling~~ road, and the present position information may be output accurately.

20 The user operation analysis means 50 receives various operations requested from the user <sup>via</sup> ~~with~~ the input unit 15, and controls ~~the~~ each unit contained in the arithmetic processing <sup>unit</sup> ~~department~~ 10 so as to execute ~~the~~ processing corresponding to the request of the user.

25 For example, when the user requests ~~the~~ <sup>a target</sup> course guidance to ~~the~~ <sup>determine</sup> goal position, ~~a~~ processing to ~~operate~~ a path from the current ~~goal~~ position to the <sup>target</sup> ~~goal~~ position

is <sup>performed by the</sup> [requested to a] path account means 51, and the information <sup>as the</sup> to <sup>from the</sup> guide path <sup>(to)</sup> course guidance means 52 is [requested to be] shown to the user. When the user requests a scroll operation of the map, which is displayed through the input unit 15 [furthermore], a scroll display of the map domain designated is requested to a map display means 54.

The path account means 51 <sup>determines a</sup> [decides an] guidance path between two spots by retrieving a node connecting an interval between two spots (the present position and goal position) designated using <sup>the</sup> Dijkstra algorithm. When determining the path, for example, a path in which the distance between two spots becomes shortest, a course by which it becomes possible to arrive <sup>in the</sup> [with a] shortest time, a path by which <sup>the</sup> [a] cost [for it] becomes the most economical etc., are provided by using different retrieval conditions.

The course guidance means 52 compares [a] link information of <sup>the</sup> guidance path obtained by the path account means 51 with the present position information obtained by the position arithmetic means 55 and the map match processing means 56, and <sup>indicates</sup> [notifies] to the user whether the car should turn to right or left, or go straight <sup>using an audio</sup> [with a] <sup>signal generated by the voice</sup> [sound by using the sound] <sup>equipment</sup> input and output [unit] 14 before passing an <sup>intersection</sup> [intersections] or by displaying the course for the car on the map on the display unit 11.

25 The menu <sup>display</sup> [displaying] means 58 receives a command output from the user operation analysis means 50, and <sup>a</sup> [the] command for displaying various kinds of a requested menu is



sent to the graphics processing means 59.

The arithmetic processing <sup>unit</sup> [department] 10 has a data read-in means 57, a graphics processing means 59, a map display domain setting means 53, and a map display means 54  
5 [furthermore].

The map display domain setting means 53 sets a map domain that should be displayed according to an algorithm determined beforehand from the present position of the moving body output[,] from the map match processing means 56,  
10 or from [a] scroll information <sup>indicating</sup> [about], a scroll direction corresponding to scroll operation input through the user operation analysis means 50.

The data read-in <sup>processing</sup> means 57 selects to read out the map data of the display domain which is set from the map memory  
15 12.

The map display means 54 sends a command to display a designated object for the map data read out, with a designated contraction scale, in a state <sup>maintaining</sup> [keeping], a designated direction <sup>with respect</sup> to an upper direction of the display  
20 unit 11, to a graphics processing means 59.

[A] <sup>by</sup> graphics processing means 59 receives the display command, formed by the map display means 54 and the menu displaying means 58, and applies the graphics image in the VRAM 36. The graphics image applied to the VRAM is managed  
25 with a <sup>color</sup> [collar] numbering, and after being converted into RGB <sup>color</sup>, corresponding to the <sup>color</sup> [collar] numbering <sup>using</sup> [with] the <sup>color</sup> [collar] pallet 37, it is displayed by the display unit.

As shown in Figure 6, the arithmetic processing  
 [department]<sup>unit</sup> 10 comprises a retrieval range setting means 60,  
 a received data analysis means 61, an icon setting means 62,  
 an icon display [position]<sup>location</sup>/setting means 63 and an icon  
 5 display means 64 [furthermore]<sup>operating</sup>, as a processing means in a  
 navigation system to optimize, amount of [the] information to  
 be communicated and to display the information received  
<sup>accordance with</sup> intelligibly in this invention.

The retrieval range setting means 60 sets one or more  
 10 items selected by the user from items shown by the menu  
 display means 58 as a retrieve object property, [and] sets a  
 (specification)<sup>specified</sup> spot on the map provided from the scroll  
 information as a center of the retrieve neighborhood, said  
 scroll information relating to the present position of the  
 15 moving body output from the map match processing means 56,  
 the [goal]<sup>target</sup> position of the moving body input through the user  
 operation analysis means 50 or the direction of the scroll  
 corresponding to the scroll operation input through the  
 user operation analysis means 50, and [set]<sup>sets</sup> a size of the  
 20 retrieve neighborhood [in]<sup>to</sup> a value decided beforehand  
 [furthermore]. The retrieve object property, the center of  
 the retrieve neighborhood and the size of the center set in  
 this way are sent to the information offering equipment 2  
 by [using]<sup>way of</sup> the display side communication equipment 21. An  
 25 example [to set]<sup>will be given for setting</sup> the information which is retrieved by the  
 user on the menu screen, by [using]<sup>reference to</sup> Figure 8.

The center of retrieve neighborhood which is set may

be <sup>selected</sup> [set] <sup>or else</sup> by using [the] information specifying a spot, [elsewhere] it is set from a position on the map. For example, <sup>a</sup> phone number and a position of the information or an address stored in the internal information memory 13 are used. <sup>The inputting</sup> [Input] of the addresses is performed by using a letter input means, a place name <sup>selection</sup> [select] means chosen from a place name list[, ] or a sound recognition means. An example of a method to set the center of the retrieve neighborhood by inputting <sup>a</sup> [the] <sup>described with reference to</sup> phone number will be <sup>a</sup> [shown in] Figure 9.

10 The retrieve neighborhood that is set may be set based on the domain and the contraction scale of the map displayed on <sup>the</sup> display unit 11. For example, when the user is <sup>attempting</sup> [going] to obtain [the] information, the map domain displayed by the display unit 11 may be used as the retrieve  
15 neighborhood.

In the above embodiment of the present invention, the size of the retrieve neighborhood is set by the information display equipment[, ]; however, <sup>also</sup> it may be set by the <sup>the</sup> information offering equipment. For example, referring to, 20 amount of [the] information sent to the information display equipment, it may be determined to be <sup>in</sup> a range near [to] the center of the retrieve neighborhood. Further by providing a means to set <sup>the</sup> intention [by] <sup>a</sup> the user, <sup>a</sup> suitable amount of [the] information may be set according to the user's intention.

25 <sup>the</sup> In <sup>the</sup> configuration of the above embodiment, <sup>the</sup> area size of <sup>a</sup> retrieval neighborhood is set with the information display[, ]; however, it is possible to set it with [the] <sup>an</sup>

information offering device. For example, considering, <sup>the</sup>  
 amount of [the] information to <sup>be sent</sup> [send] to the information  
 display, the area size is set so that, <sup>a</sup> suitable amount of  
 [the] information is obtained by selecting, <sup>an</sup> area sequentially  
 5 near to the center of, <sup>the</sup> retrieval neighborhood. Furthermore,  
 by providing a means for <sup>accommodating the wishes</sup> [setting taste] of the user, it may  
 be set so that the amount of [the] information becomes  
 suitable, <sup>for the selected area</sup> sequentially, <sup>suitable to the user</sup> [selecting the tasted] information.

In the above embodiment, the retrieval range, <sup>set by</sup> [that] the  
 10 retrieval entry means 60 [sets], in other words, the key words,  
<sup>information retrieval</sup> for, <sup>the</sup> [retrieving], is, <sup>the</sup> retrieval object, [property], a center of  
 the retrieval neighborhood, or <sup>the</sup> a size of retrieval  
 neighborhood, however, <sup>since</sup> [as], it becomes a premise that [it], <sup>the object</sup> is  
 15 [on] a business or <sup>an object</sup> [it], may be utilized, when information is  
 demanded for the user, business hour information and <sup>occupancy</sup> [vacant]  
 information may be automatically selected as the search  
 conditions. When such search conditions are used, the  
 information provided by the retrieval becomes to include  
 [the] dynamic information that is changed with [the] time. For  
 20 example, when it is applied to the <sup>information concerning</sup> retrieval of a service  
 station, <sup>since a</sup> [as the] service station <sup>which is open for</sup> [in] business becomes,  
 retrieval object at, <sup>the</sup> retrieval point in time, it becomes  
 possible to <sup>determine</sup> [understand] whether, <sup>a service station</sup> [it], <sup>open for</sup> is, <sup>actually</sup> [on] business or not  
 before <sup>actually</sup> going there [actually], <sup>thereby providing</sup> [it] becomes good, beneficial  
 25 information for the user. Of course, <sup>since</sup> [as], unnecessary  
 information is not communicated, the communication line  
 capacity may be reduced. When hotel and ferry information

are searched <sup>for</sup> in the same way, <sup>the</sup> date to utilize <sup>the service</sup> may be set, <sup>setting as a</sup> thereby, search condition <sup>the existence of a vacancy</sup> [as that there is vacant] on the date [is automatically] set. Furthermore, <sup>concerning features</sup> information of the car which the user <sup>is using</sup> [uses] or <sup>preference</sup> [taste] information of the user may be set as <sup>a</sup> [the] search condition. For example, when ferry and parking lot information are searched, <sup>as to the size</sup> [size] information of the car may be stored [to be set]. When restaurant and service station information are searched, credit card information that the user may utilize and chain store <sup>as to the type of store</sup> information [that] the user utilizes willingly may be set. In these cases, smooth information offering becomes possible for the user, <sup>and a</sup> reduction <sup>in the</sup> [of] communication line capacity becomes possible simultaneously [too]. Of course, retrieval information described as above may be combined. These <sup>items of</sup> information are set by providing [the] setting means whenever the information is going to be obtained from the information offering device 2[.]; however, <sup>the information</sup> [they] may be set automatically <sup>providing</sup> by <sup>in</sup> [preparing the] means <sup>the information</sup> which will be registered [itself with] beforehand. An example to set the <sup>preference</sup> [taste] of the user is shown in Fig. 10.

A retrieval range display means may be <sup>provided</sup> [prepared] in order to show the retrieve neighborhood set as <sup>described</sup> [the] above, and <sup>by</sup> [By] displaying the retrieve neighborhood, it becomes possible to easily recognize the range of the map on which <sup>is to be displayed</sup> the information [to obtain belongs]. In Figure 11, when the <sup>target</sup> [goal] position neighborhood is the retrieve neighborhood, an <sup>is shown in which</sup> example [that displays] the retrieve neighborhood <sup>is designated by</sup> [with] a

circle [is shown]. In addition to <sup>this</sup> [above], <sup>an arrow</sup> [a triangle mark] in Figure 11 shows the present position [ ] and a flag [mark] shows the <sup>target</sup> [goal] position [ ], and they are shown <sup>in the same way in</sup> in the same way in the following figures.

5 When <sup>past</sup> [the] information [obtained at the past] is provided, if a temporary memory means to store it and the retrieval range displaying means to display the retrieve neighborhood of the information stored are <sup>provided</sup> [prepared], the amount of <sup>data</sup> [the] communication with the information offering equipment may be reduced, <sup>since</sup> [as] the information is judged to be <sup>already stored</sup> in the information display equipment, even if the information offering equipment isn't accessed.

15 When the <sup>past information</sup> [information which received at the past] is displayed, <sup>the</sup> [a] time when <sup>was received</sup> [receiving] said information, in said temporary memory means is displayed with <sup>the</sup> retrieve area by the retrieval range display means, <sup>and so</sup> whether said information should be obtained from said information offering equipment may be <sup>determined</sup> [referred]. An example of a case <sup>in which</sup> [that], the retrieve area of <sup>past</sup> information [received at the past] is displayed with <sup>of receipt</sup> the time [when received it] is shown in Fig. 12. If the information stored in <sup>the</sup> [said] temporary memory means in addition to <sup>the</sup> above is <sup>has</sup> [constructed to be] erasable [on] a predetermined time point when the user <sup>ordered</sup> it or when a predetermined time interval has passed after the power source is switched off or <sup>other</sup> [the] information is obtained, the <sup>amount of</sup> information which <sup>needs to</sup> [should] be stored may be prevented from becoming <sup>excessively</sup> [infinitively] large.

In the above embodiment, the [center of] retrieve area  
 5 [is] <sup>center</sup> one, however, <sup>plural centers</sup> [such center] may be set [to be plural]. For  
 example, when [the] several nodes which connect the <sup>target</sup> [goal],  
 position with the present position are set as the centers  
 of <sup>the respective</sup> [every] retrieve areas, it looks like as that the  
 information along a course is referred to. In other words,  
 a problem [as] that the user demands [the] <sup>a</sup> information many  
 times in order to <sup>obtain</sup> [get] the information on <sup>a</sup> path[,] disappears.  
 When the nodes in the path from the present position to  
 10 <sup>target</sup> [goal], position shown with a thick line are determined to be  
 the centers of the <sup>respective</sup> [every] retrieve areas, an example  
 representing the domain that became a range to be retrieved  
 actually is shown in Fig. 13.

<sup>The</sup> [A] received data analysis means 61 analyzes data to be  
 15 provided through the display side communications equipment  
 21, selects several <sup>items of</sup> information contained <sup>in</sup> [by] said data, and  
 takes out information necessary for <sup>later</sup> [an afterward] processing,  
 for example, <sup>a</sup> name, location on a map, property, <sup>or</sup> affiliated  
 information contained by respective information. In  
 20 analysis of data, it is necessary to know <sup>in</sup> [with] what kind of  
 form the data stores the information. As an example, a case <sup>of</sup>  
 storing the information with an order decided beforehand is  
 shown by Fig. 14. As an <sup>wherein</sup> other example, a case [that] the  
 form of the data is contained in the data is shown <sup>in</sup> [by] Fig.  
 25 15. In the example shown in Fig. 15, in addition to <sup>the</sup> above,  
 by <sup>storing</sup> [utilizing that] the name, the location, <sup>and</sup> the property [are]  
 [stored] from the top <sup>in</sup> [by] this order, they are stored <sup>a</sup> [with the]

form decided beforehand, the data form may be [to be] specified in the data regarding only the affiliated information.

An icon setting means 62 takes out a corresponding icon from the icon memory based on the property taken out with the received data analysis means 61 so as to set it as an icon showing <sup>a representation</sup> [represence], of the information. The icon setting means 62 further has an icon presence judgment means which judges whether the corresponding icon exists in the icon memory 20, and when the corresponding icon does not exist in the icon memory 20, the icon setting means 62 may require [to transmit] <sup>transmission of</sup> the corresponding icon to the information offering equipment 2. Otherwise, a means to add a letter or an icon, such as an emblem, to the information sent from the information offering equipment 2 <sup>is provided</sup> [are prepared], and the icon [may work] may be taken out from the information sent in this way. Then, if [an] information to show [an] <sup>the</sup> existence of the icon with the information sent is constituted to be sent simultaneously, it is understood easily that the icon corresponding to the information sent is contained <sup>therein</sup>. Figure 16 shows <sup>examples</sup> [an example] of the [equipment] [which displays the] <sup>display of</sup> information containing [the] <sup>an</sup> icon which has been sent from the information offering equipment and the icon <sup>provided</sup> on a map based on this information.

25 A icon drawing location setting means 63 sets a location [of] <sup>for</sup> the icon so that the corresponding information <sup>is</sup> [are] displayed on a suitable location of the map based on [a] <sup>map</sup>



location information [on the map taken out with] <sup>retrieved using</sup> the received data analysis means 61 and [an] information from the map display domain setting means 53. When <sup>the</sup> [reduction] scale of the map changes or the map is scrolled, the location of <sup>the</sup> icon is adjusted [again] suitably. If the data which [have] <sup>been</sup> sent [are] <sup>is</sup> just indicated on the map, the icons are overlapped or the information isn't <sup>confirmed</sup> [settled] <sup>the</sup> within (a) screen of the display sometimes. In such a case, for example, the [reduction] scale of the map, by which the information sent is <sup>confirmed</sup> [settled] <sup>is indicated</sup> in the same screen is obtained, [to be notified] to the map display domain setting means, and resetting of the location displaying the icon may be <sup>effected by changing</sup> [done] according to the [reduction] scale <sup>of the data display P</sup> [changed]. An embodiment <sup>for</sup> avoiding <sup>an</sup> (the) overlap of the icons will be explained <sup>whether there is an</sup> (in the) next. <sup>An</sup> (A) overlap judgment means to judge <sup>whether there is an</sup> (the) overlap of the icons is provided, and when it was decided that the icons will overlap, the overlap information is <sup>indicated</sup> [notified] to the icon display location setting means, and the icons are set so as not to overlap mutually by adjusting the [displaying] location of the icons <sup>using</sup> [overlapped with] the icon displaying location setting means. <sup>Fig. 17A and 17B illustrate</sup> [Figure 17 is] <sup>an</sup> an example in which overlap of [the] icons is avoided by resetting [of] the location of the icons when the two icons are overlapped. In a case of this example, actually, the display of the icons <sup>which</sup> overlapped needn't be done, however, it is <sup>in order to</sup> shown <sup>the</sup> [for] describe the operation. Another method to avoid overlap of [the] icons may be adopted by, for example, changing the

<sup>by</sup> <sup>the</sup> [reduction] scale of the map, or <sup>the</sup> changing size of the icon.

A icon display means 64 sends a command which displays an image of the icon set by the icon setting means 62 to the graphics processing means 59 at a location set by the icon display location setting means 63.

An example in which the information received from the information offering equipment 2 is displayed with an icon on the map by using <sup>the</sup> above-mentioned construction is shown <sup>in</sup> [by] Figure 18.

10 In the above embodiment, as the information sent from <sup>is able to</sup> the outside is shown with an icon on the map, the user, easily understands <sup>relating to</sup> the location [of] the information that has been sent. While making use of this feature, furthermore, in order to provide [an] individual information, an icon property setting means 65 may be provided [furthermore] as shown in the following.

<sup>the</sup> The icon property setting means 65 sets property of an icon, such as color and size, intensity, chroma, light on / light off, display / non-display, based on information <sup>retrieved by</sup> [taken out with] the received data analysis means 61. And, the icon display means 64 displays the icon based on the property set by the icon property setting means 65. When it is done in this way, the individual information, besides the location of the information according to a color of the

25 icon, for example, may be displayed. An example will be explained using Figure 19, in which <sup>involves</sup> received data [are] information <sup>concerning a</sup> [about] restaurant, and <sup>a</sup> [the] property <sup>thereof is indicated by</sup> [of their]

which  
 color is set. For example, an icon of a restaurant which is  
 not crowded is shown <sup>in</sup> [by] blue (white in Fig. 19), an icon of  
 a restaurant which is available <sup>but requires</sup> [if] waiting <sup>for</sup> a little, is  
 shown <sup>in</sup> [by] yellow (black in Fig. 19), and an icon of a  
 5 restaurant which is not available <sup>without</sup> [if] waiting a <sup>substantial time</sup> [little] is  
 shown <sup>in</sup> [by] red (dotted line in Fig. 19). When the restaurant  
 is not available [if waiting a little], it is meaning-less  
 to display the icon and so <sup>changed to a</sup> [that] the property may be [turned into] non- display <sup>mode</sup>  
 (transparent color).

10 [An] <sup>the</sup> arithmetic processing <sup>unit</sup> [department] 10 <sup>provides</sup> [relates to a]  
 navigation system processing to control <sup>the</sup> amount of <sup>(the)</sup>  
 information to be communicated [so as to be] <sup>in a way according to</sup> suitable [by] the  
 present invention [furthermore], and to display the received  
 information intelligibly, and has a received data /  
 15 location memory means 66, an icon select means 67, an  
 inside data retrieval means 68 and a detailed data display  
 means 69.

The received data / location store means 66 stores  
 each information <sup>item</sup> provided by the received data analysis  
 20 means 61, and the location at which the corresponding icon  
 should be displayed is obtained from the icon display  
 location setting means 63 and is stored with each related  
 information <sup>item</sup>.

The icon select means 67 decides which <sup>of the</sup> icon is  
 25 selected by the location and the received data / location  
 memory means 66, when detecting that the user selects one  
 part of the screen <sup>using</sup> [by] the user operation analysis means 50.

Then, if the icon selected is <sup>determined</sup> [decided], the information corresponding to the icon is retrieved from the received data / location memory means 66 and is transmitted to the inside data retrieval means 68. ↩

5 By transmitting the location data of the icon selected with the icon select means to the path account means 51, a course guidance processing to go by way of the location with the icon which the user has selected becomes possible.

10 As means to detect that the user selects one part of the screen, some methods are proposed, as <sup>follows</sup> [following]. For example, a pointing device, such as a touch panel having many pressure sensors on the screen <sup>maybe</sup> [is] provided [so as to be] [set] so as to overlap on the screen. Otherwise, a cursor

15 display means for displaying a cursor on the map, a cursor movement means to <sup>allow</sup> [let] the cursor <sup>to be</sup> moved, a cursor location acquisition means to calculate the location of the cursor on the map by detecting a quantity of movement of the cursor <sup>effected</sup> [moved] by the cursor movement means, and a means to

20 recognize the determination of the user are <sup>provided</sup> [prepared], and the user <sup>determines a location</sup> [decides] after the user <sup>moves</sup> [let] the cursor [moved], <sup>whereby</sup> [thereby] the location selected by the user is detected. Movement of the cursor is performed by moving the cursor <sup>on</sup> [for] the screen while keeping the map fixed, or by moving

25 the map <sup>on</sup> [for] the screen while keeping the cursor fixed. In the case that the cursor displayed in this way is used, the icon may be [recognized to be] selected by detecting the

location of the cursor provided by the cursor location acquisition means, on a specified icon, or the icon (being) most near (from) the cursor when <sup>the</sup> [a] distance between the each icon and the cursor is compared [with], or the icon being most near from the cursor when a distance between the [each] icon and the cursor is compared [with] and (it) is less than a predetermined set value [may be selected]. Further, one more example of the detecting means will be explained as <sup>follows</sup> [following]. Providing a button having a tabulation function in an input means, the icon which the user wishes to select may be obtained by changing one display property of the icon which is displayed whenever the button is pushed. The icon which <sup>Does it</sup> [changes] display property <sup>changed</sup> may be selected sequentially from the center of the screen, or by using the cursor movement input means, the icon almost being in cross course may be selected in the next selection.

The inside data retrieval means 68 obtains [a] receipt <sup>indicating</sup> information corresponding to <sup>an</sup> icon selected by the icon select means 67, the detailed information related to this receipt information [is] <sup>being</sup> retrieved from the internal information memory 13. As mentioned above, referring <sup>to the fact</sup> that most of the information that the navigation system utilizes <sup>is</sup> [are the] individual information that <sup>concerns</sup> [have the] location information on the map, [the] individual information having [the] location information, <sup>which is the</sup> same as the location information on the map corresponding to <sup>a</sup> [the] selected icon may be retrieved from the internal information memory 13. Even if

there is considered as <sup>there is</sup>  
 [they are] individual information to be related [to] in  
 addition to above, the locations which should be the same,  
 each other on the map may not <sup>actually</sup> be equal [strictly] because of <sup>an</sup>  
 error which <sup>may occur</sup> [occurs on] <sup>in</sup> the data processing. In this case,  
 5 for example, the information [of the] <sup>as to a</sup> location which is [in] <sup>at</sup> a  
 distance within <sup>the degree of</sup> error [degree] being allowed and in the  
 nearest location is selected as the individual information  
 to be related <sup>there is</sup>. Moreover, when the location on the map of  
 the individual information is represented with the area,  
 10 the overlapped areas are selected as the individual  
 information to be related <sup>there is</sup>. Methods to search the individual  
 information to be related <sup>there is</sup> are provided easily in the same  
 way [as above]; for example, the title included in the  
 receipt information may be searched as [the] <sup>a</sup> key word, and  
 15 the information common to the receipt information and the  
 information from the internal information memory 13, such as <sup>a</sup>  
 serial number, phone number, and address may be set as the  
 key word for the retrieval.

A detailed data display means 69 transmits a command,  
 20 to display the detailed information that was <sup>retrieved</sup> [taken out] by  
 the inside data retrieval means 68, to graphics processing  
 means 59. Otherwise, it <sup>retrieves</sup> [takes out] the receipt information  
 corresponding to the icon selected from the icon select  
 means 67 from the received data / location memory means 66, <sup>and</sup>  
 25 transmits the command, to display this <sup>data,</sup> to the graphics  
 processing means 59. Then, the <sup>received</sup> [receive] data may be  
 displayed according to a display format contained

beforehand in the received data. The detailed information  
 taken out from the [inside] data retrieval means 68 and the  
 receipt information corresponding to the icon selected are  
 selectively displayed according to a request from the user  
 5 by a user operation analysis means 50. Otherwise, the  
 detailed information with a disposition decided beforehand  
 and the receipt information may be displayed so as to be  
 overlapped. Besides, in the information stored in the  
 [inside]<sup>internal</sup> information memory 13, a [display] method<sup>display of</sup> of the  
 10 receipt information is set beforehand, and the detailed  
 information and the receipt information may be displayed  
 according to this setting. Figure 20<sup>(a)</sup> is an example<sup>(c)</sup> in  
 which<sup>(c)</sup> the detailed information in the information selected  
 and the receipt information are displayed so as to [be]  
 15 <sup>appear side by side</sup> [overlapped]. <sup>In the</sup> [Is this] example<sup>of Fig. 20(b)</sup>, the icon is represented by the  
 property and the name of the individual information, and  
 the location of the icon is disposed in line <sup>on</sup> [in] the screen,  
 and it may displayed with an icon like an image thereof on  
 the map.  
 20 <sup>the</sup> [An] arithmetic processing<sup>unit</sup> [department] 10 <sup>provides</sup> [relates to] a  
 navigation system processing to control<sup>the</sup> amount of <sup>(the)</sup>  
 information to be communicated<sup>in a</sup> [so as to be] suitable <sup>way according to</sup> [by] the  
 present invention [furthermore], and to display the received  
 information intelligibly, and<sup>further</sup> has a select icon emphasis  
 25 means 70, a detailed data display domain setting means 71  
 and a screen configuration change means 72.

The select icon emphasis means 70 controls the icon

property setting means<sup>65</sup> so that the icon which the user<sup>has</sup> selected <sup>using</sup> [by] the icon select means 67 may distinguish <sup>from</sup> [the] other <sup>icons</sup> [icon] on the screen. The icon property setting means 65 is set so as to change the property of the icon, for example, by changing a color of the selected icon, by raising <sup>the</sup> [a] intensity of the selected icon, by <sup>causing a</sup> flashing on and off <sup>of</sup> the selected icon, by reducing the intensity of the icon which isn't selected, or by <sup>inhibiting</sup> [stopping] the display of <sup>an</sup> [the] icon which isn't selected (transparent color). Figure 10 21 shows an example in which the intensity of the icon which wasn't selected is reduced.

The detailed data display domain setting means 71 sets a domain for indicating [the] detailed data so that [the] detailed information [taken out <sup>retrieved by</sup> with] the inside data 15 retrieval means may be displayed <sup>at</sup> [to] a location on the screen set beforehand. For example, as exemplified in Figure 21, <sup>the</sup> left half of the screen is assigned as a domain for displaying the detailed data. [As] <sup>in</sup> another <sup>example</sup> [embodiment is] exemplified in Figure 1, the location of the selected icon 20 is retrieved from the receive data / location memory means and <sup>a</sup> [the] domain which does not cover the location is [obtained to be] set.

As the screen configuration changes when displaying [the] detailed information <sup>on</sup> [to] the screen <sup>using</sup> [with] the detailed 25 data display domain setting means 71, a screen configuration change means 72 sets the display domain of the map according to this change, too. For example, when



the detailed information is displayed on the left half of the screen, the map is to be displayed in the remaining right half. Then, <sup>when</sup> [because] the location of the icon selected by the user is given, the screen configuration change means <sup>is</sup> [are] set to scroll the map so that the selected icon comes into a center of <sup>the</sup> right half of the screen, and the icon related to the detailed information is displayed in the central neighborhood of the map, <sup>whereby</sup> [thereby] peripheral map information are easily understand. Figure 21 shows an <sup>example in which an</sup> [embodiment which displays the] icon and the detailed information related thereto <sup>are displayed</sup> as stated above. This <sup>feature</sup> [embodiment] is effective for the user when the user selects one of the <sup>icons</sup> [icon] and <sup>examines</sup> [watches] the detailed information. On the other hand, <sup>for</sup> [For] example, when the detailed information <sup>the user</sup> which wants to watch is successively selected by the icon according to the movement of the cursor, it become difficult to watch it because <sup>scrolling</sup> [the scroll] of the map occurs whenever the selected icon is changed [in sequence]. In such a case, it is better [to set] not to scroll the map even if   
 20 the detailed information is displayed, and, for example, as shown in figure 1, the detailed information is displayed so that the map <sup>remains</sup> [is kept to be] fixed and the selected icons do not overlap.

In the construction stated above, the detailed data   
 25 display means 69 is provided to transmit <sup>9</sup> [the] command, to display [the] detailed information [to] <sup>at</sup> a screen location set by the detailed data display domain setting means 71, to

the graphics processing means 59. *→*

Being constructed in this way, <sup>*detailed*</sup> [Detailed] information <sup>*for an*</sup> [of the] icon which a user <sup>*has*</sup> selected may be displayed, <sup>*while still displayed*</sup> keeping the icon [displayed] on the map, and furthermore, the <sup>*subject*</sup> [objected] icon <sup>*maybe*</sup> [is] distinguished from other icons easily, <sup>*and so a*</sup> [the] detailed information display which is <sup>*very*</sup> easy to <sup>*understand*</sup> [be understood] <sup>*very much*</sup> may be provided.

In the above <sup>*example*</sup> [embodiment], a case <sup>*where*</sup> [that] the detailed data <sup>*is larger*</sup> [become bigger] than the domain set by [detailed data] area setting means <sup>*has not been considered*</sup> [isn't assumed]. This is because it is expected that the information is <sup>*particularly*</sup> provided to a driver <sup>*a large amount of*</sup> [especially]. In other words, when [bigger] data than <sup>*the*</sup> [a] domain <sup>*size*</sup> [are] <sup>*allow*</sup> expected to be displayed, an operation to <sup>*to move or scroll*</sup> [let] the displayed data <sup>*resulting in an increased*</sup> [moved] becomes necessary, [and a] burden <sup>*on*</sup> [of] the user <sup>*there are situations where it is desirable*</sup> [is increased]. Actually, <sup>*than the domain size will normally accommodate*</sup> [a case to want] to display more data <sup>*example*</sup> [is expected however]. In an [embodiment] which solves this problem, the detailed information is divided into several pages, each of which <sup>*is*</sup> [become] smaller than the domain <sup>*which*</sup> [where] is set by the detailed data area setting means, and <sup>*the*</sup> [a] display means <sup>*is operated*</sup> to show <sup>*the pages in sequence*</sup> [existence of the former page or the] [next page is provided, and the page is constructed to be] [changed] according to a request by the user, <sup>*whereby*</sup> [thereby] the burden <sup>*on*</sup> [of] the user is decreased. In <sup>*Fig. 22(a) and 22(b)*</sup> [figure 22], a case <sup>*in which*</sup> [that] [the] information is displayed <sup>*in*</sup> [into] two pages is shown. In <sup>*9*</sup> such a construction <sup>*requested*</sup> [as above], it is understood easily that <sup>*the*</sup> [the] scroll operation <sup>*requested*</sup> by the user is performed only for [a] <sup>*the*</sup> map. Accordingly, when the user operation analysis means

detects a scroll operation <sup>request</sup> by the user, <sup>this request</sup> (it) is processed to  
 [order to] scroll only the map.

Furthermore, after having <sup>effected a display</sup> [displayed intelligibly] <sup>according to</sup> in,  
 the present invention as above stated, the arithmetic  
 processing <sup>unit</sup> (department) 10 <sup>employs</sup> (has) a screen configuration memory  
 5 means 73 <sup>a</sup> [having a function] to return to former display.

The [A] screen configuration memory means 73 stores how to  
 display <sup>data</sup> (it) on the screen according to [the] operations by  
 the user, such as <sup>the</sup> start <sup>an</sup> [to] <sup>and the</sup> display of the received  
 10 information, selection of <sup>the</sup> [the] icon, <sup>and the</sup> closing of information  
 display by user operation analysis means 50, <sup>whereby</sup> [thereby] it  
 operates to return to the display state displayed formerly.  
 For example, a case <sup>where</sup> (that) the user <sup>has requested</sup> (demanded an) information  
<sup>concerning</sup> (of) a hotel <sup>located in a certain</sup> (of an objected position) neighborhood, <sup>or area</sup> from the  
 15 information offering equipment will be explained <sup>with reference to</sup> [by using],  
 Figure 23. If a plane map <sup>on</sup> which a present position is  
 located <sup>at the map</sup> [in a] center <sup>is displayed on</sup> [to display], the whole screen at a point  
 in time when the user <sup>requests</sup> [demands] the information, screen  
 information [is] such as " right before information request,  
 20 total plane map display, present position center " <sup>is</sup> [are]  
 stored. In order to show the <sup>requested</sup> (demanded) information, after  
 having displayed the information <sup>concerning a</sup> (of the) hotel which <sup>has</sup> [is]  
<sup>available rooms</sup> (vacant) with an icon, the user pushes <sup>the</sup> " map " button so as  
 to return to an original map screen by <sup>ending</sup> [finishing] the  
 25 display of the information, <sup>and so</sup> [thereby], the screen information  
 [is] such as " right before information request, total plane  
 map display, present position center " <sup>is</sup> [are] transmitted to

the map display domain setting means 53, <sup>and</sup> the total screen returns to display <sup>of</sup> the present position in the center of the map. In the above <sup>example</sup> [embodiment], the user <sup>effects</sup> [does] a change of the screen configuration, however, it may be assumed that  
 5 change timing may be replaced after a predetermined time has passed, or it may be replaced when <sup>the</sup> velocity of the car becomes faster than a predetermined value.

The information offering equipment 2 will be explained using figure 3.

10 The information offering equipment 2 has a mail server 23, a WWW server 24, an internet navigation server 25, a user authentication server 26, a control unit 22, a gateway 27 and [an] offering side communication equipment 28.

The gateway 27 has a unique address which is  
 15 discriminated from other equipment connected to the network 4, it is connected with the network 4 and <sup>operates</sup> [lead to] communicate with the information offering server which is <sup>connected</sup> [communicated] with the network 4, and it receives [an] information that has been sent through network 4 to the  
 20 information offering equipment <sup>2</sup>.

The offering side communication~~s~~ equipment 28 communicates with the information display equipment 1 so as <sup>information flows</sup> to send <sup>therefrom</sup> or receive [the] information.

The mail server 23 stores [an] electronic mail sent to  
 25 [the] <sup>a</sup> user who is <sup>able</sup> [capable] to access [to] the information offering equipment 2 and outputs the electronic mail which is received according to <sup>a</sup> request of the user.

The WWW server 24 stores [the] information [is] such as a letter, a sound or a voice, a <sup>stationary</sup> [standstill] drawing, and [an] animation, according to a format decided beforehand, and provides [an] information stored according to a request of the user.

The internet navigation server 25 stores [the] information provided through the gateway 27 <sup>from an</sup> [and the] offering side communication device with a format decided beforehand in order to <sup>display the information</sup> [indicate it] on the information display 1 <sup>to the</sup> and outputs [it to] the information display 1 <sup>at the</sup> [by] request of the user. The internet navigation server 25 receives [the] updating information from <sup>an</sup> [the] information offering server 3, [and] stores the received updating information <sup>in place</sup> [instead] of the corresponding old information, and updates the information so that the information to <sup>be sent</sup> [offer] <sup>is renewed</sup> to the information display 1 [becomes to be new] continuously.

The user authentication server 26 stores [an] information of the user who is <sup>allowed</sup> [capable] to access [to] the information offering equipment 2, or [an] information to manage the service that the information offering equipment 2 may offer to every user, and is <sup>able</sup> [capable] to limit the user [who demand to connect] or to limit the service provided to the user <sup>who desires to effect connection</sup> through the gateway 27 and the offering side communications equipment 28.

The control unit 22 controls the various servers 23, 24, 25, 26, the gateway 27, and the offering side

communications equipment 28, and offers an electronic mail service [performed] in [the] <sup>a</sup> world [of a] <sup>wide</sup> network, such as <sup>the</sup> internet [etc.], and a WWW (World Wide Web) <sup>requests</sup> service etc. [.] Furthermore, the information that the user <sup>requests</sup> [demands] is offered by processing as [that] the information provided to the information display equipment 1 is collected through <sup>the</sup> network 4, by processing as [that] the collected information is stored in the network 4, by processing as [that] the corrected information is changed into a suitable information [formality] <sup>format</sup>, in order to transmit and display it to the information display equipment, and by processing as [that] the information demanded by the user is referred to be taken out from the internet navigation server, and by processing as [that] a retrieve result is transmitted to the information display equipment.

<sup>An example</sup> (A configuration) <sup>performed by the</sup> of the function [means of] control unit 22 <sup>will be</sup> [is] explained using figure 7.

<sup>provides</sup> As shown in figure 7, the control unit 22 [relates to] [a means] for [the] navigation system processing in which the information provided to the information display equipment 1 is collected, the amount of the information to transmitted <sup>accordance with</sup> in, this invention is optimized, and the <sup>received</sup> information is displayed intelligibly <sup>for</sup> [by] the user, and <sup>The control unit 22</sup> has an individual information reception means 80, an individual information updating means 81, a user request analysis means 82, an information retrieval means 83 and an information processing means 84.

The individual information reception means 80 receives the individual information which the information offering server <sup>has</sup> provided <sup>via</sup> (on) the network <sup>and</sup> (top), sends <sup>it</sup> to the information offering equipment 2 through the gateway 27.

5 The individual information updating means 81 stores the individual information which is received by the individual information reception means 80 in the corresponding domain of the internet navigation server.

The user request analysis means 82 analyzes the  
 10 request of the user based on the data sent from the information display equipment 1 and controls each unit in the control unit in order to execute the request. For example, when the request to offer <sup>lodging availability</sup> (vacant) information has been sent together with <sup>the</sup> (a) retrieve items, such as, coordinates  
 15 of <sup>an</sup> object position and <sup>description</sup> hotel, the information is transmitted to the information retrieval means and (a) necessary information is retrieved from the internet navigation server 25 to be transmitted to the information display equipment 1. Then, <sup>able</sup> (a) registration information <sup>of</sup> (of) <sup>the</sup> the user, who is <sup>able</sup> (capable) to receive the service offered by the information offering equipment 2, is stored in the user authentication server 26, <sup>the</sup> (an) identification data of the user is obtained from the information display equipment 1, and <sup>the</sup> (the) service that doesn't fit <sup>the</sup> (to a) condition <sup>will</sup> (is operated) <sup>for</sup> not <sup>this</sup> (to) be executed based on <sup>this</sup> (these) information, thereby, <sup>provided</sup> for example, when a service charging a fee is <sup>provided</sup> (prepared), it becomes impossible to prevent the user from escaping <sup>payment of</sup> the

(?)

[charging of the] fee.

The information retrieval means 83 searches [the] <sup>for</sup> information that the user needs from the internet navigation server 25 according to the retrieval item that has been sent from the information display 1 and hands the search results to the information processing means 84. As mentioned above, the retrieval item sent from the information display 1 may include [the] conditions, such as <sup>a</sup> [on] <sup>relationship</sup> business <sup>availability for use</sup> or [available to be utilized]. Such conditions may not be set in the information display 1, [and] <sup>but</sup> the information retrieval means 83 may set it in the search condition automatically.

The information processing means [eight <sup>84</sup> 4] <sup>84</sup> converts the plural information searched by the information retrieval means 83 into [the] data that the information display 1 is <sup>able</sup> [capable] to process, and hands the converted data over to the offering side communication device 28, <sup>and so display of</sup> [thereby] the retrieval information becomes [to be] possible [to be] [indicated] with the information display 1. In order to realize optimization of the communicated information amount that is a distinctive characteristic of the present invention, the information which is updated with a low frequency, such as the brief description of [the] facility, is eliminated from the individual information to be sent to the information display 1. In addition to <sup>the</sup> above, according to the environment of the information display, for example, [situation] whether the moving body is [in] moving or <sup>is</sup> [in]



<sup>stopped</sup>  
 [stopping], the communicated information amount changes so  
 that intermission of the communication line changes, and  
 the reduction of the information may be executed by judging  
 the change. For example, as it is possible to understand  
 5 whether the moving body is moving or not may be shown with  
 the information display 1, and the information offering  
 device 2 is notified of the effect when stopping, and the  
 information processing means 84 is operated <sup>to</sup> not [to] control  
 the information reduction. <sup>P</sup>The information processing means  
 10 84 may be operated to change the amount of the information  
 to be transmitted to the information display 1. For example, <sup>the</sup>  
 maximum amount of the information <sup>be transmitted</sup> to [transmit] may be set  
 beforehand, the communicated information amount sent <sup>at</sup> [by] one  
 time is <sup>set</sup> [transmitted <sup>not</sup>] to <sup>not</sup> exceed the maximum amount, or a  
 15 processing to <sup>establish</sup> [make] the size of the image is performed when  
 the image data <sup>is</sup> [are] sent. Moreover, the data reduction  
 process <sup>mentioned</sup> as above is <sup>based on</sup> [decided to be operated by] obtaining [the]  
 information <sup>such</sup> as [that] the situation of the information  
 display 1, for example, <sup>whether</sup> the [setting] car is running or not,  
 20 the communications means is PHS or a cellular phone, and  
 the display 11 of information display 1 is large or small.

The above configuration example <sup>is based on the</sup> premise that the  
 information is sent from the information offering server 3.  
<sup>However</sup> [Furthermore], a configuration of the control unit 22 that is  
 25 [capable] <sup>able</sup> to demand (the) individual information will be  
 explained <sup>for a case where</sup> [when] the information offering equipment 2  
 directly [access in] <sup>accesses</sup> the information offering server 3. The  
 ^

control unit 22 has a server information store means 85, a retrieve object server setting means 86 and an individual information request means 87 <sup>for this purpose</sup> [furthermore].

5 The server information store means 85 stores <sup>the</sup> information, <sup>the</sup> such as <sup>and</sup> kind and contents, address, <sup>and</sup> access method of the information that may be offered by every information offering server 3.

The retrieve object server setting means 86 sets the information offering server 3 in order to obtain the  
10 information necessary for the internet navigation server 25 based on the information stored by the server information store means 85. Then, in a case <sup>where</sup> [that], the user request analysis means 82 is operated to obtain <sup>the</sup> information by accessing the information offering server 3 at a point in  
15 time when the user requests <sup>the</sup> information, the information offering server 3 which is <sup>able</sup> [capable] to offer the information requested by the user[,] may be retrieved so as to be set. When <sup>since</sup> [being] constructed in this way, <sup>specific</sup> [as] it becomes possible to access the information offering server  
20 3 which is <sup>able to provide</sup> [necessary and minimum when] the information, <sup>which</sup> is necessary, <sup>the</sup> burden <sup>on</sup> [of] the network may be reduced.

The individual information request means 87 accesses the information offering server 3 set as the retrieve object and outputs the request to offer the information.  
25 The timing for requesting an information offering may be obeyed to the indication by a timer which promotes a request starting in a time set previously, or the user

request analysis means 82 operates to obtain the information by accessing the information offering server 3 at the point in time when the user requests the information, and the timing may be a point in time when the retrieve object server setting means 86 sets the retrieve object server.

In the example constituted (as) above, it is <sup>a</sup>premised that the information that has been sent from the information offering server 3 [are] <sup>is</sup> respectively optimized. Furthermore, in <sup>in</sup> the information offering equipment 2, a construction which make the information stored in the internet navigation server 25 most suitable will be explained.

The control unit 22 has a fixed form format setting means 88 and a selection object data setting means 89 <sup>for this purpose</sup> [furthermore].

The fixed form format setting means 88 sets a format of the information stored in the internet navigation server 25, and makes <sup>it possible</sup> for the individual information updating means 81 [to be possible] to update the information of the internet navigation server 25 according to this format. For example, as shown in figure 14, the format is provided to fit [to] the information display equipment 1.

A selection object data setting means 89 <sup>establishes</sup> [sets] whether the information is renewed according to <sup>the various properties</sup> [every property] of the information <sup>it possible</sup> [ ] and makes <sup>it possible</sup> for the individual information updating means 81 [to be possible] to update the information

of the internet navigation server 25 according to this setting. For example, if the information sent from the information offering server ~~(are)~~<sup>is</sup> divided in<sup>to</sup> several files, an extent that may be stored in the internet navigation server is set~~ed~~ utilizing the extent determined depending on the property.

In the above embodiment, the information offering equipment 2 is constituted ~~(expecting)~~ to send ~~(the)~~ information into the information display equipment 1, however, ~~(as)~~ the internet navigation server is one kind of the server too. Therefore, a construction ~~(as that)~~<sup>wherein</sup> the user on the internet accesses the information on the internet navigation server~~(,)~~<sup>another</sup> may be provided, or ~~(other)~~ construction ~~(as that)~~<sup>wherein</sup> the user of the information display equipment 1 accesses the server on ~~(the)~~<sup>a</sup> network ~~(except)~~<sup>other than</sup> the information offering equipment 2 through this information offering equipment 2~~(,)~~ may be provided.

Because, the information is sent from ~~(the)~~<sup>an</sup> information offering server connected ~~(to)~~ through a network when the information is updated, if the information sent is stored, the latest information may be stored. Furthermore, ~~(as)~~<sup>since</sup> the necessary information may be obtained by accessing the necessary information offering server ~~(on)~~<sup>at</sup> a timing ~~(that)~~<sup>desirable to</sup> the user ~~(wants)~~, the latest information may be accessed in this case too. Relating to the information provided to the user and sent from the information offering equipment to the information display equipment, the amount of the data is

to that needed  
 reduced, [at need], thereby it becomes possible to transmit  
 the information in a short time, or communication by using  
 a cellular telephone system becomes possible.

The information that is sent from the information  
 5 offering equipment is displayed with an icon on the  
 corresponding map [top] by using [a] <sup>icon</sup> location information [of]  
 [the information], <sup>so that</sup> the location of the information is easily  
 understood, and because only [of] the icon is <sup>displayed</sup> [display], the  
<sup>concentration</sup> [gaze] of the user isn't needed, <sup>and so</sup> it is easy for the driver to  
 10 understand it. Because the detailed information of the  
 corresponding information is displayed by selecting <sup>an</sup> [the]  
<sup>which is</sup> icon <sup>with</sup> displayed, the user may get the needed information, [by]  
<sup>a</sup> [an] <sup>of</sup> minimum <sup>and</sup> operation, with a good <sup>retrieval</sup> [retrieve] efficiency. When  
 there is detailed information in the information display  
 15 equipment, it is possible to provide enough information for  
 the user by showing the detailed information, and as there  
 is no need to send the detailed information from the  
 information offering equipment, <sup>the</sup> [communication] amount of [the]  
<sup>very transmitted</sup> data <sup>so</sup> decreases, and <sup>the data</sup> it becomes possible to transmit [it] in a  
 20 short time. <sup>when</sup> [and] the cellular telephone system becomes [easy]  
<sup>even easier to use</sup> [to be utilized still more].